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ROCKY FLATS

**Outyear Plan
Operable Unit No. 7 -
Present Landfill (IHSS 114),
Inactive Hazardous Waste
Storage Area (IHSS 203) and
Spray Evaporation Areas
(IHSS 167.2 and 167.3)**

Revision 1



April 1995

DOCUMENT CLASSIFICATION
REVIEW INSTRUCTIONS
CLASSIFICATION OFFICE

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ADMIN RECORD

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1/36

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1. INTRODUCTION

The Rocky Flats Environmental Technology Site (RFETS) is located at the foot of the Rocky Mountains in northern Jefferson County, Colorado. The site is approximately 16 miles northwest of Denver and is near the suburban communities of Westminster, Broomfield, and Arvada. The RFETS covers approximately 6,550 acres with approximately 400 acres used for industrial activities.

The past mission of RFETS was the production of components for nuclear weapons. The final products included component parts manufactured from uranium, plutonium, beryllium, stainless steel, and other metals. Production activities included metalworking, fabrication and component assembly, plutonium recovery and purification, and associated quality control functions. Research and development in the fields of chemistry, physics, materials technology, nuclear safety, and mechanical engineering were also conducted.

Operations at the plant began in 1952. In 1989, many of the production functions at the plant were suspended. In January 1992, the decision was made not to resume plutonium production.

Past production operations led to the release of hazardous substances at the site. Currently, these releases are being investigated and remediated. Release of hazardous materials have been grouped into 16 operable units (OUs) to facilitate investigation and remediation. The Present Landfill, asbestos disposal areas, Inactive Hazardous Waste Storage Area, and East Landfill Pond and sediments, and adjacent spray evaporation areas have been designated as OU 7.

1.1 Purpose

This OU 7 Outyear Plan (OYP) describes, schedules, and estimates the cost of investigative and remedial activities at OU 7. Cost estimates in the OYP assume that OU 7-specific funds will be used for all activities. The schedule is based on working days. This document will be used to support the Five-Year Plan (FYP), work packages, and other U.S. Department of Energy (DOE) and EG&G RFETS (EG&G) planning documents. The OYP will be updated as necessary to reflect new technical

information; new regulatory requirements; impacts from schedule, cost, and resource constraints; and impacts from other RFETS programs.

1.2 Organization of Report

The organization of the OYP is based on the requirements of the FYP and work packages. Section 1 describes the site, past work, and other potential impacts on OU 7 remediation. Section 2 addresses regulatory issues. Section 3 discusses planning assumptions. Section 4 presents activities by fiscal year. Section 5 presents milestones. Section 6 presents costs. Cost estimates were formatted in Excel.

1.3 Background

OU 7 is located north of the plant complex at the western end of No Name Gulch. For the purpose of estimating the costs of remedial actions, OU 7 is divided into the following four areas:

- Present Landfill (Individual Hazardous Substance Site [IHSS] 114)
- Asbestos disposal areas
- Inactive Hazardous Waste Storage Area (IHSS 203)
- East Landfill Pond and sediments
- Spray evaporation areas adjacent to the East Landfill Pond

Each of these areas is discussed in greater detail below.

1.3.1 Present Landfill (IHSS 114)

The Present Landfill (IHSS 114) is an operating landfill that covers an area of approximately 27 acres. Operation of the landfill was initiated in 1968 to provide for disposal of the site's nonradioactive solid wastes. A portion of the natural drainage was filled with soils from an onsite borrow area to a thickness of up to 5 feet to construct a surface on which to start landfilling. Waste was then delivered to the landfill and spread across the work area. Wastes included paper, rags, floor sweepings, cartons, mixed garbage and rubbish, demolition material, and miscellaneous items. Approximate volume of waste and interim soil cover is 415,000 cubic yards.

Five gas vents are present within the operating landfill. These vents are constructed of polyvinyl chloride (PVC) and extend above the ground surface approximately 5 feet. Numerous monitoring wells are also present within the landfill.

In September 1973, tritium and strontium were detected in leachate draining from the landfill. In response, a sampling program was undertaken to determine the location of the tritium source, monitoring of waste prior to burial was initiated to prevent further disposal of radioactive material, and interim response measures were developed to control the generation and migration of the landfill leachate.

Interim response measures included construction of two detention ponds immediately east of the landfill, a subsurface intercept system for diverting groundwater around the landfill, a subsurface leachate collection system, and a surface-water diversion system.

The surface-water diversion ditch was designed to divert surface water runoff around the landfill. The West Landfill Pond was designed to impound leachate generated by the landfill. The East Landfill Pond provided a backup system for any overflow from the West Landfill Pond and collected groundwater from the groundwater intercept system. The leachate collection system drained only to the West Landfill Pond; however, intercepted groundwater could be directed to either pond or to the surface drainages downgradient of the East Landfill Pond by a series of valves.

Between 1977 and 1981, portions of the leachate collection and groundwater intercept systems were buried during landfill expansion. The eastward expansion covered the discharge points of the leachate collection system into the West Landfill Pond. The West Landfill Pond was covered in May 1981 during further eastward expansion of the landfill. In 1982, two slurry walls were constructed to prevent groundwater migration into the expanded landfill area. These slurry walls were tied into the north and south arms of the groundwater intercept system.

Although landfill wastes are buried in the leachate collection trench, there is no evidence of solid waste burial outside of the clay barrier or slurry walls. Based on the Phase I and Phase II Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigation (RFI/RI) at OU 7, there is evidence of

groundwater flow beneath the northwestern section of the groundwater intercept system and through the northern slurry wall wing

The existing leachate collection system is only partially effective. Although the gravel backfill portion of the diversion trench is effective in keeping leachate within the northern, southern, and western limits of the landfill, leachate seeps out along the eastern boundary just above the East Landfill Pond and may impact the groundwater around the pond. Leachate is prevented from migrating downward beneath the landfill by the claystone bedrock.

The existing surface-water diversion ditch appears to be effective in diverting offsite surface waters around the landfill and the East Landfill Pond.

Because records indicate that some hazardous waste was disposed at the landfill, it was considered an interim status RCRA-regulated unit and included in the RCRA Part B permit application for the RFETS. The landfill currently accepts only nonhazardous solid waste and therefore will not be permitted as an operating RCRA unit. In 1988, an alternate groundwater monitoring program was implemented at OU 7 in accordance with 6 Colorado Code of Regulations (CCR) 1007-3 and 40 Code of Federal Regulations (CFR) 265.90 (d) for interim status RCRA units.

The waste disposal procedures currently used at the landfill have not significantly changed since the landfill went into operation in 1968 (DOE 1991a). Waste is delivered to the landfill three days a week throughout the morning and early afternoon. In mid-afternoon, waste is spread across the work area. After the waste has been dumped and radiation monitoring has been completed, the waste is compacted and buried with 6 inches of clean fill from onsite stockpiles. A "lift" of waste is completed by the addition of a 3-foot-thick layer of compacted soil.

1.3.2 *Inactive Hazardous Waste Storage Area (IHSS 203)*

The Inactive Hazardous Waste Storage Area (IHSS 203) is located at the southwest corner of the Present Landfill. This area was actively used between 1986 and 1987 as a hazardous waste storage area for both drummed liquids and solids. Fifty-five-gallon drums containing liquids were stored in 14 cargo containers. One

additional container was used to store spill-control items such as oil sorbent and sorbent pillows.

In 1987, all cargo containers were removed from the storage area, and hazardous materials are no longer stored there.

1.3.3 *East Landfill Pond*

As discussed above, the East Landfill Pond was originally built as part of an interim response measure implemented in 1973 to control overflow from the West Landfill Pond and collect groundwater from the groundwater diversion system. In 1974, an engineered pond embankment was constructed to replace the original temporary embankment. The engineered embankment included a low-permeability clay core keyed into bedrock. The pond covers approximately 2.5 to 2.7 acres and contains approximately 5,000,000 gallons when at 75% capacity.

1.3.4 *Spray Evaporation Areas*

To prevent the two detention ponds from overflowing and discharging into the drainage, water was periodically sprayed on the ground surface adjacent to the landfill ponds to enhance evaporation. Areas where spray evaporation operations historically occurred were designated as IHSSs 167.1, 167.2, and 167.3 and incorporated into OU 6. After a review of historical records, the locations of IHSSs 167.2 and 167.3 were changed to the areas adjacent to the East Landfill Pond. These IHSSs now fall within the OU 7 boundary (CDPHE 1993).

1.4 **Other RFETS Programs and Impacts on OU 7**

The current and planned investigation and remedial activities at OU 7 are being conducted by the EG&G Environmental Restoration Program Division (ERPD) of RFETS. ERPD conducts environmental and remedial programs at 16 RFETS OUs and conducts environmental evaluations and monitoring programs sitewide. Many of the sitewide programs interact with the OU investigations. Sitewide surface-water and groundwater monitoring, soil sampling, and ecological monitoring use data produced by OU investigations, and monitoring wells installed as part of OU-specific investigations become part of the sitewide network.

2. REGULATORY CONSIDERATIONS

The investigation and remediation of OUs at RFETS are subject to both federal and state regulations. These regulations and their potential impact on the OU 7 remediation are discussed briefly below and are discussed in greater detail in the Potential Applicable or Relevant and Appropriate Requirements for Operable Unit No. 7 (DOE 1994) and the Proposed Closure Strategy for Operable Unit No. 7 (EGG, 1995).

2.1 Interagency Agreement

In order to establish a common basis of understanding and to integrate the requirements of federal regulations with those of the Colorado Department of Public Health and Environment (CDPHE), an Interagency Agreement (IAG) was negotiated among DOE, the U.S. Environmental Protection Agency (EPA), and CDPHE and signed on January 22, 1991 (DOE 1991b). The purpose of the IAG is to establish a legally enforceable framework to facilitate coordination of cleanup and oversight efforts and to standardize requirements. The IAG establishes specific milestones and time frames for remedial actions as well as penalties for noncompliance with the agreement.

The IAG framework established the joint EPA, CDPHE, DOE agreement for designation and administration of RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remediation at RFETS. CDPHE is the lead regulatory agency for sites designated as RCRA units. The designation of OUs as RCRA-or CERCLA-regulated units is based on the effective date of the 1980 RCRA regulations. Sites that were in operation at the time that these regulations went into effect required "interim status permits" to continue operation and therefore became RCRA units. At RFETS, the following are considered interim status units: Solar Evaporation Ponds, West Spray Field, Present Landfill, Original Process Waste Lines, and various smaller IHSSs grouped into the Other Outside Closures and Inside Building Closures OUs. Sites that were inactive at the time that RCRA regulations went into effect were designated as CERCLA OUs.

In 1988 RFETS prepared the Present Landfill Closure Plan (DOE 1988) for OU 7; however, the activities detailed in the closure plan were superseded by the IAG. The

LAG requires that RFETS conduct Phase I and Phase II RFI/RI at OU 7 to characterize contaminant sources and determine the nature and extent of contamination. Additional requirements include the corrective measures study/feasibility study (CMS/FS) and treatability studies to support the decision-making process. OU 7 successfully streamlined the RFI/RI and CMS/FS process by implementing presumptive remedies and integrating CMS/FS requirements into the IM/IRA Decision Document.

2.2 State and Federal Regulations

2.2.1 State Regulations

The section of the Code of Federal Regulations governing hazardous waste (40 CFR Section 265.1[c]) states, "The requirements of this part do not apply to . . . a person who treats, stores, or disposes of hazardous waste in a state with a RCRA hazardous waste program authorized under Subpart A or B of Part 271 of this chapter."

Colorado is such a state, and therefore, the governing regulations for the Present Landfill are contained in 6 CCR 1007-3 Part 265.

Closure and post-closure requirements applicable to the Present Landfill are specified in Subpart G of 6 CCR 1007-3. Sections 265.11 through 265.115 address closure requirements, while Sections 265.116 through 265.120 address post-closure requirements. In general, a closure plan (and amendments, if necessary) must be submitted and approved as specified in Section 265.112. An approved post-closure plan (and amendments, if applicable) must be implemented following the certification of final closure of the landfill. Requirements for this plan are contained in Section 265.118 and include the requirement that monitoring activities be performed to comply with Subparts F (groundwater monitoring requirements) and N (landfills). Closure and post-closure plan requirements will be integrated into the IM/IRA Decision Document in accordance with regulatory guidance.

Applicable requirements for groundwater monitoring at the Present Landfill (contained in Subpart F) include preparation of an alternate groundwater monitoring plan (other than the one described in Sections 265.91 and 265.92){265.90(d)} and implementation of the plan (265.93[d][7]). As a result, no specific requirements of Subpart F are specifically applicable to the post-closure monitoring. Subpart N

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contains design requirements for new landfills, operating requirements for all landfills (design of runoff control systems, collection and holding facilities for runoff and runoff control system, and control of fugitive dust), and closure and post-closure requirements. The only Subpart N closure and post-closure requirements applicable to the Present Landfill are to (1) cover the landfill and (2) monitor and maintain the landfill (including the cover, benchmarks, and monitoring systems) as specified in approved closure and post-closure plans and amendments.

The Present Landfill Closure Plan prepared in 1988 was never formally approved and was superseded by the requirements of the IAG. RFETS will prepare a decision document that will address presumptive and remedial actions and post-closure monitoring at the Present Landfill. Compliance with the IAG fulfills remediation and closure requirements for OU 7, including the Present Landfill.

2.2.2 *Presumptive Remedies*

Use of presumptive remedies is a method developed by EPA to streamline site investigation and selection of remedial actions based on historical data from successful remedial actions at similar sites. Source containment is the designated presumptive remedy for CERCLA municipal landfills (EPA 1993a). The containment presumptive remedy consists of the following elements:

- Institutional controls
- Landfill cap
- Landfill gas collection (and treatment if necessary)
- Source area groundwater control to contain plume
- Leachate collection (and treatment if necessary)

The presumptive remedy as outlined above was adopted by DOE, CDPHE, and EPA and will be applied to the OU 7 Present Landfill and the Inactive Hazardous Waste Storage Area. This streamlined approach, which is consistent with Colorado Hazardous Waste Act (CHWA) closure requirements supported by guidance in the

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and recent EPA guidance for landfills (EPA 1991, 1993a, 1993b), eliminates the need for initial identification and screening of alternatives during the feasibility study and allows for acceleration of the schedule to implement remedial actions and achieve final closure.

2.2.3 *Other Remedies*

Closure strategies for affected areas within OU 7 and not covered under the presumptive remedies are discussed in detail in the Closure Strategies document for Operable Unit Seven.

3. PLANNING ASSUMPTIONS

This section presents the technical, cost, and schedule assumptions that are used for estimating costs and schedule durations for OU 7 Interim Measure (IM)/Interim Remedial Action (IRA), construction, and closure activities.

3.1 Interim Measure/Interim Remedial Action Decision Document and Design

3.1.1 *Technical*

- Submittal of the IAG IM/IRA Decision Document will also satisfy IAG requirements for submittal of the Phase II RFI/RI Report and the Phase II CMS/FS Report.
- The determination whether to take action on areas outside of the presumptive remedy will be made based on the results of focused risk assessments.
- Land use agreements among stakeholders will be established before final decisions on remediation strategies are made.
- The Applicable or Relevant and Appropriate Requirements issues will be resolved in sufficient time to complete the IM/IRA Decision Document.
- NEPA values will be integrated into CERCLA documentation (IM/IRA Decision Document) in lieu of an environmental assessment.
- Actions for OU 7 will comply with CHWA closure requirements for landfills and be consistent with "Presumptive Remedies" guidance from EPA.
- Feasibility evaluations of alternatives will be conducted for the IM/IRA decision process and not under a separate "feasibility study."

- There will be no actual treatability studies performed at OU 7. Demonstrated technologies are available and acceptable to support the IM/IRA. Treatability studies will be limited to documentation of demonstrated technologies and site characterization evaluation.

3.1.2 *Cost*

- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sites. All support for these areas will be provided in field operation work packages.
- No material or labor costs for maintenance of buffer zone roads, radios, access control, general cleanup, or radiological engineering and health and safety support outside the OU is included in this work package.
- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.

3.1.3 *Schedule*

- Dispute issues will not impact the schedule. Dispute issues are not anticipated on this project.
- Streamlined efforts for No Further Actions will be developed under a pre-approved process eliminating the IHSSs from further consideration. No Further Actions will constitute "mini Records of Decision" and no longer be included in the OU.
- The current schedule assumes that all DOE, EPA and CDPHE review periods represent project commitments on the part of their respective organizations. Failure to provide review comments within the prescribed duration will result in a subsequent schedule slip.

- The Public Comment Period including the Public Hearings will not exceed 60 calendar days. Extension of Public Comment Periods is not anticipated.
- The transition to the new integrated contract will not impact the baseline.
- The exiting IAG will remain in effect.

3.2 Remedial Construction

3.2.1 Technical

- The presumptive remedy is isolation and containment, which includes institutional controls, landfill cap, gas collection and treatment (as necessary), source area groundwater control, and leachate collection and treatment (as necessary).
- Stabilize slope north of East Landfill Pond
- Remove pond sediments
 - Empty pond by pumping water to a tank truck
 - The East Landfill Pond is not considered "waters of the U.S." under section 404 of the Clean Water Act
 - Pond water will be treated with the leachate water at the existing OU 1 or OU 2 treatment facilities, Sewage Treatment Plant or other drainage ponds as appropriate
 - Treated water and leachate will be piped to holding tanks
 - Dewater sediments, air dry
 - Remove approximately 4,000 cubic yards of sediments (based on a sediment thickness of 1 foot and a 2.5-acre area for pond)
 - Sediments will be hauled to landfill and spread across surface
- Remove surface soils in spray evaporation area
 - Hot spot removal

- Place in landfill
- Construct slurry wall on northwest side of pond
- Leachate collection and treatment system
 - Install leachate collection sump at east end of landfill
 - Construction will consist of excavation, fill, installation of slab and walls to house pump station, and installation of storage tank
 - Treated leachate will be piped to holding tanks
 - Transport by vacuum truck to OU 1 or OU 2 treatment facility, Sewage Treatment Plant or other drainage ponds as appropriate
 - Low flow rate (approximately 1 gallon per minute) of leachate into collection system
- Multilayer cap
 - Existing wells will be abandoned
 - 25 wells, 5 vents: wells will be overdrilled to remove casing, plugged, filled with bentonite grout, and capped with cement
 - Compaction of landfill material to remove voids
 - 27 acres to be compacted
 - Will use a vibration roller
 - Foundation layer will consist of compacted native soil or clay
 - Foundation layer will include additional material to complete final landfill contours
- Gas vent layer
 - Geotextile fabric will be installed on both the top and bottom of the gas vent layer
 - Gas vent layer will consist of Geotextile filter, polyvinyl chloride (PVC) perforated pipe in drain rock, vacuum blowers, header, and a flare
 - Collection pipes around perimeter of cap, 200-foot spacing

- Vent pipes: 4-inch high-density polyethylene (HDPE) - length 5 feet
 - Landfill gas will be flared
 - Geosynthetic clay liner will consist of 1/4-inch Bentomat
 - Flexible membrane liner will be 30 mil
 - Drainage layer will consist of washed sand
 - Geotextile filter will be installed
 - Soil cover will consist of native soil
 - Soil cover will be compacted and graded
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- Revegetation will consist of the addition of 2 feet of topsoil, disking, seeding, mulching with grass-hay mixture, crimping the mulch, and tacking the entire area to help prevent seed loss due to wind or water erosion
 - Native grasses and forbs will be used in the seeding mixture
 - Construction quality assurance control tests will be necessary
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- Groundwater collection and treatment
 - French drain south of the East Landfill Pond
 - Installation of piping to storage tank and installation of storage tank
 - Collection in storage tanks
 - Transport by vacuum truck to OU 1 or OU 2 treatment facility (ultraviolet peroxide and ion exchange)
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- The East landfill pondwater is FO39 "contained in" environmental media(surface water). Likewise the source area groundwater is FO39 "contained in" environmental media (groundwater) and the pond sediments are FO39 "contained in" environmental media.
 - All accelerated actions will support the final remedy.
 - A safety analysis report is not required prior to remedial construction.

- The identification of a potential or listed threatened and endangered species (Preble's Meadow Jumping Mouse habitat) will not delay field work.
- The wetlands mitigation project will be completed prior to destruction of any wetlands within OU 7.
- Ecological evaluations will be performed on a watershed basis.
- Transfers of East Landfill Pondwater to A and B series ponds will continue as needed to maintain the pond at acceptable levels.
- All debris generated from OU 7 accelerated actions and/or interim actions will be disposed beneath the landfill cap.
- The existing Dave-Bacon "covered" determination for the construction activities will not change.
- The emissions from the gas vents in the landfill will not trigger permitting requirements.

3.2.2 Cost

- Funding will be available.
- OU 7-specific funding will be used for all activities.
- All systems will be commercially available.
- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sties. All support for these areas will be provided in field operations work packages.
- No material or labor costs for maintenance of buffer zone roads, radios, access control, general clean up, or radiological engineering and health and safety support outside the OU is included in this work package.

- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.
- Health and safety support will be needed for all construction activities
- Separate utilities will be needed for each operating system
- Outside construction contractors will perform remedial activities
- All outside construction contractors will need RFETS training
- Command post will be needed for the duration of all construction activities
- Regulatory constraints and requirements will not change

3.2.3 Schedule

- There will be minimal weather delays
- Construction of the groundwater collection and treatment system, and leachate collection system can occur concurrently
- Construction of the multilayer cap will start after the construction of the leachate collection system has been completed
- Treatment systems will not need extensive testing before becoming operational
- Regulatory agency approval of designs, plans, and specifications will be timely
- The new sanitary landfill will be operational 30 days prior to the start of IM construction.

3.3 Operation, Maintenance, and Post-Closure Monitoring and Reporting

3.3.1 *Technical*

Performance Monitoring will be conducted under a separate ADS (DOE 1995).

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4. FISCAL-YEAR NARRATIVES

Narratives discussing OU 7 activities for each fiscal year are presented below. Specific milestones for each fiscal year are presented in Section 5.

Fiscal Year 1996

The draft Title II design will be submitted to the regulatory agencies in mid FY96. The IM/IRA Decision Document will be finalized during FY96 and the final IM/IRA Implementation Document will be delivered to the regulatory agencies in mid FY96. The construction process will begin in mid FY96 and will include preparation of the bid package, evaluation of proposals, and construction contract award.

Fiscal Year 1997

Construction of presumptive remedies and remedial actions will begin in mid FY97. Initial construction activities include pond and soil removal. Construction must begin no later than 30 days after receipt of the final volume of hazardous waste. Final closure must be completed within 180 days after receipt of the final volume of waste. Construction of the gas collection and treatment system will be concurrent with the multilayer cap.

Fiscal Year 1998

After closure, DOE or EG&G must submit a closure certification and a survey plat. The closure certification must be signed by an independent registered professional engineer (or independent qualified soil scientist) and certify that the closure has been conducted in accordance with the closure plan. The survey plat must be prepared and certified by a professional land surveyor licensed in the State of Colorado and must indicate the location of hazardous waste disposal units with respect to permanently surveyed benchmarks. The survey plat will be submitted to the state regulatory authority or the EPA regional administrator and the local land authority.

DOE or EG&G must submit a record of the type, location, and quantity of hazardous wastes disposed to the state no later than 60 days after certification of closure. After closure, DOE or EG&G must record a notation on the deed to the facility property noting that the property has been used to manage hazardous wastes, its use is

restricted, and a survey plat and record of wastes have been filed with the local land authority and the state director. DOE or EG&G must also submit a copy of the notation to the deed and a certification stating that the notation has been filed to the state regulatory authority (EPA 1987).

Fiscal Year 1999 through Fiscal Year 2028

Long term monitoring, maintenance and reporting functions will be funded under a new ADS.

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5. SCHEDULE

A schedule for the design, construction, operation, and maintenance of remedial actions and post-closure monitoring is included in Figure 1. Milestones associated with these activities are listed below.

Milestones

Fiscal Year 1996

Begin Accelerated Action Construction	23 Oct 1995
Submit Final IM/IRA decision document	05 Jan 1996
Submit Draft Title II IM design	30 May 1996
Submit Final Title II IM design	27 Sep 1996

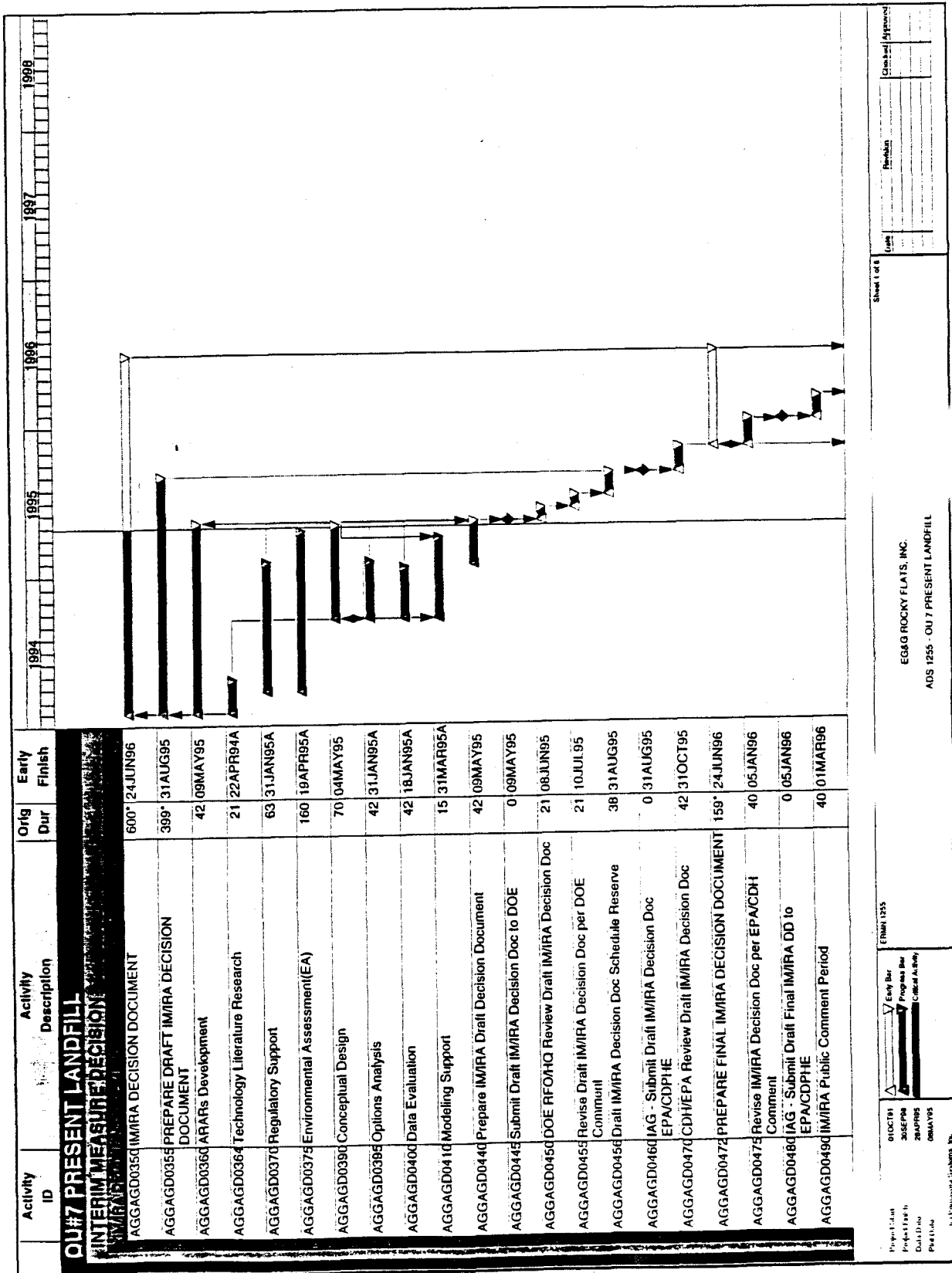
Fiscal Year 1997

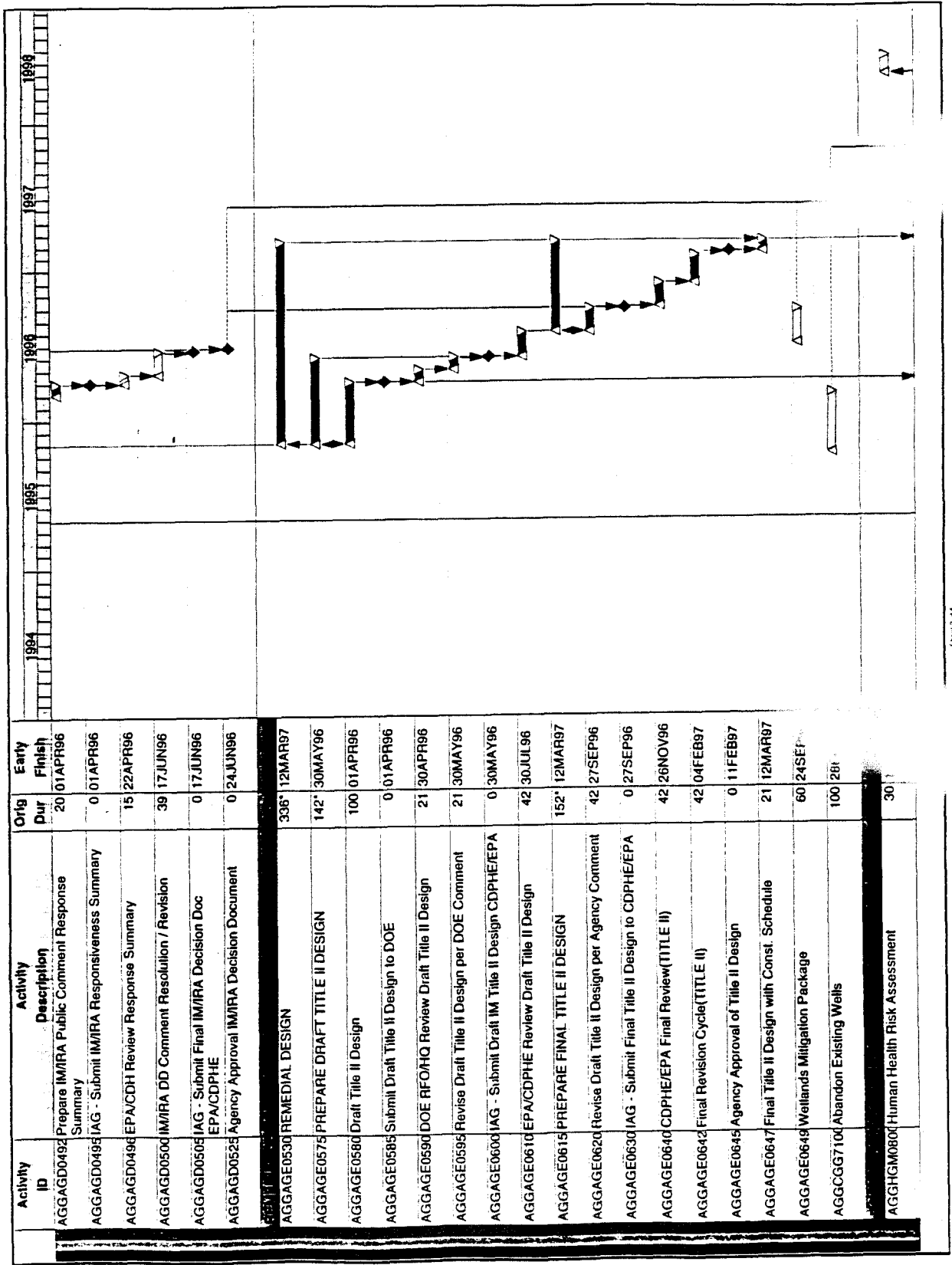
IM Construction begins	10 Jun 1997
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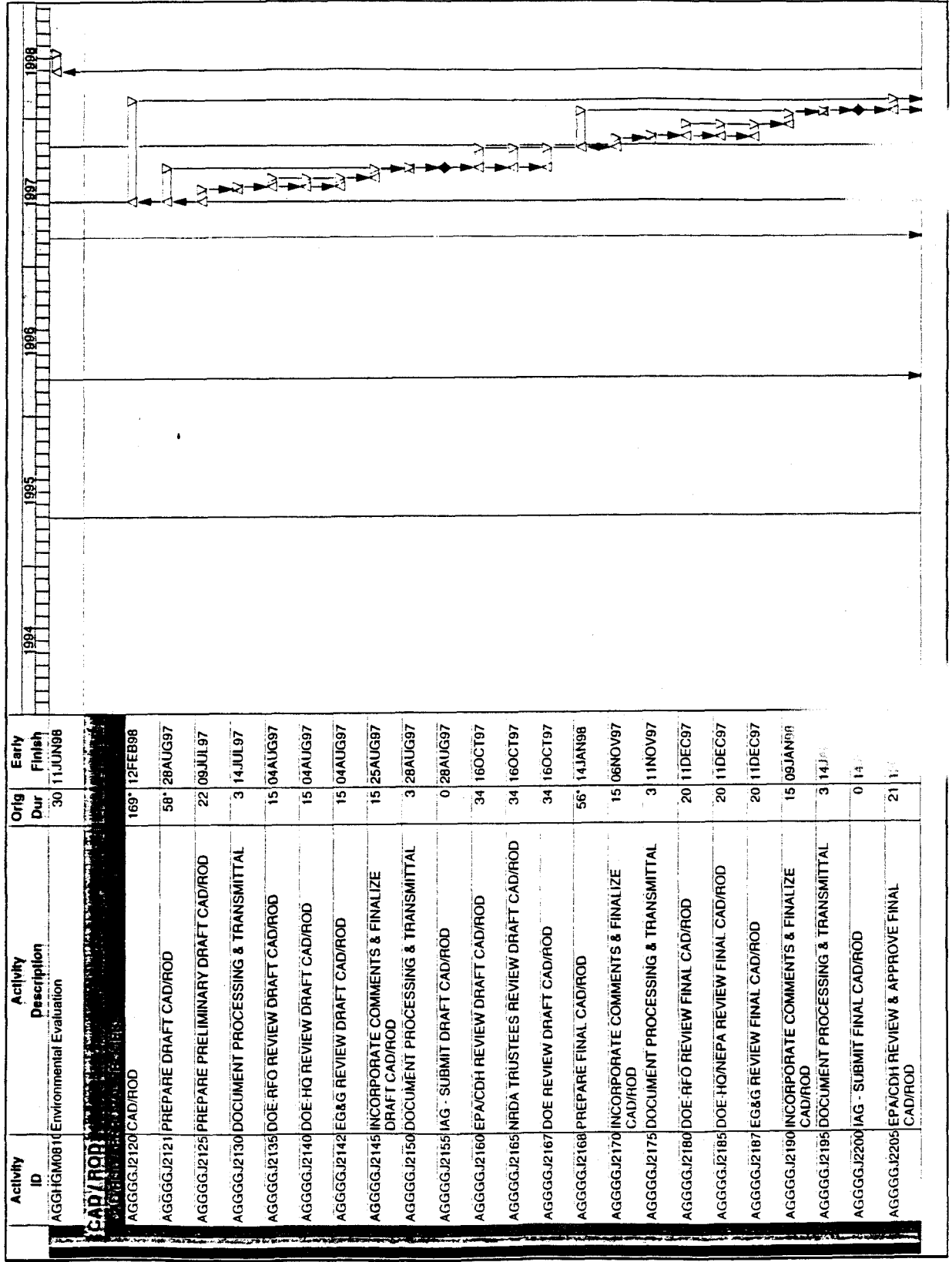
Fiscal Year 1998

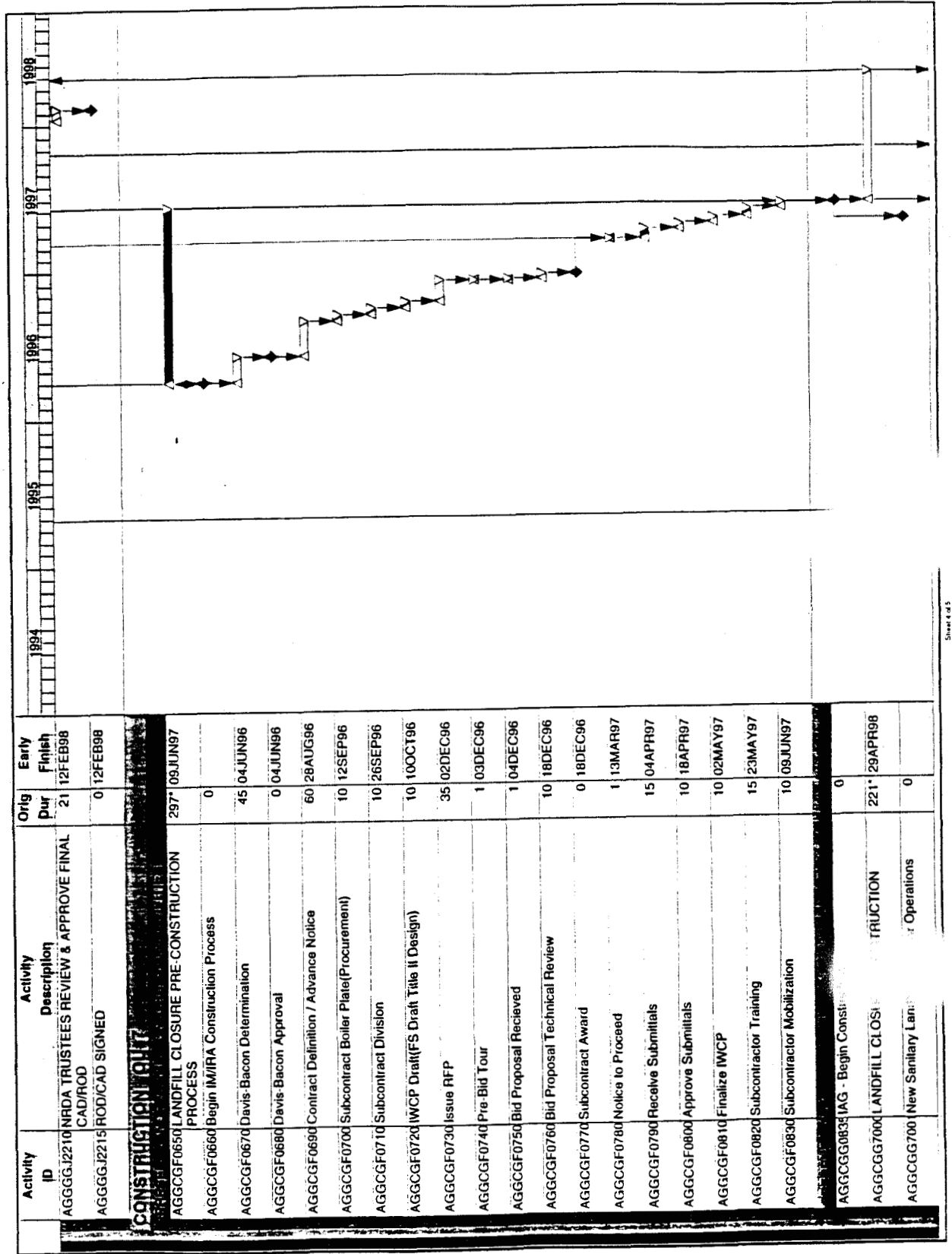
Closure certification	28 Jul 1998
Survey plat	28 Jul 1998
Record of wastes	28 Jul 1998
Deed notification	28 Jul 1998

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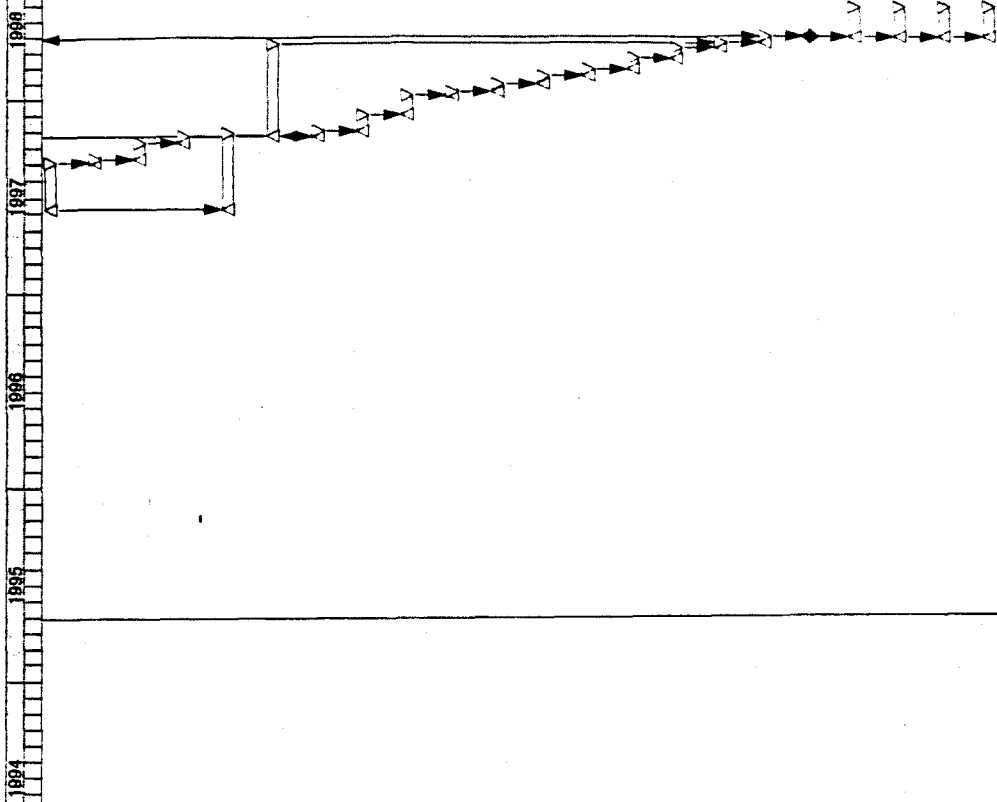








Activity ID	Activity Description	Orig Dur	Early Finish
AGCGG7010	Construct Slurry Wall	60	03SEP97
AGCGG7020	Dewater Pond	5	10SEP97
AGCGG7030	Dewater Sediments	21	09OCT97
AGCGG7040	Sediment Removal	10	23OCT97
AGCGG7080	Install Groudwater Collection and Treatment Syst	100	29OCT97
AGCGG7090	MULTILAYER CAP	115	15APR98
AGCGG7110	Compaction of Waste	5	30OCT97
AGCGG7120	Install Foundation Layer	20	01DEC97
AGCGG7130	Install Gas Vent Layer	20	06JAN98
AGCGG7140	Install Geogrid	5	13JAN98
AGCGG7150	Install Geosynthetic Clay Liner	10	27JAN98
AGCGG7160	Install Flexible Membrane Liner	10	10FEB98
AGCGG7170	Install Drainage Layer	10	24FEB98
AGCGG7180	Install Soil Cover	15	17MAR98
AGCGG7190	Revegetation	15	08APR98
AGCGG7200	Fencing	5	15APR98
AGCGG7205	Demobilization	10	29APR98
AGCGG7210	Landfill Closure Construction Complete	0	29APR98
AGGHGL0040	Closure Certification	40	25JUN98
AGGHGL0050	Survey Plat	40	25JUN98
AGGHGL0060	Record of Wastes	40	25JUN98
AGGHGL0070	Deed Notation	40	25JUN98



6. Cost

Cost estimates for closing the landfill were developed using presumptive remediation. The components of the presumptive remedy include a multilayer cap, source area groundwater control, leachate collection and treatment, landfill gas collection and treatment, and institutional controls. Cost estimates for reporting are also included.

Cost estimates were developed using current-year unit prices. Table 1 contains the unit costs for all activities. Construction costs are broken down into labor, equipment, and materials, where appropriate and where the data was available. A standard 25.3% Overhead and profit (O&P) was also added where appropriate (EG&G 1995).

Unit costs were estimated using several sources. The majority of the construction costs were developed using the Means index (R.S. Means Company 1995). Other costs were developed using vendor quotes, catalog prices, and professional experience.

Table 1 Operable Unit 7 Unit Costs

Item	Size	Unit	Material	Unit Labor	Equip	Unit Total	Unit Total	Unit Total	Notes
IM/IRA SUPPORT, DOCUMENTS, AND DESIGN									
Subcontractor Project Management-Investigation	1 year		\$9,818	\$472,551	\$0	\$482,369	\$482,369	\$482,369	Current Contract MTS 353017TB3TRB234-9
Total Project Management								\$482,369	Investigation and Remediation
IM/IRA Documents and Design									
Environmental Evaluation	1		\$5,960	\$86,194	\$0	\$92,154	\$92,154	\$92,154	Current Contract MTS 353017TB3TRB234-9
Remedial Design	1		\$129,931	\$103,540	\$0	\$233,471	\$233,471	\$233,471	Current Contract MTS 353017TB3TRB234-9
IM/IRA Decision Document	1		\$89,066	\$197,947	\$0	\$287,013	\$287,013	\$287,013	Current Contract MTS 353017TB3TRB234-9
Total IM/IRA Documents and Design								\$612,638	
PERMITTING & WETLAND MITIGATION	1							\$426,138	2.0% of total project costs 0100700100

CONSTRUCTION

Site Improvements									
Site Demolition	2000 linear foot		\$0.00	\$7.20	\$2.94	\$10	\$12.71	\$25,411	Remove and reset chain link 02055540700
Site Clearing	23 acre			\$995.00	\$1,100.00	\$2,095	\$2,625	\$60,376	Clear and grub, 0211040010
Abandon existing wells	30 wells/vents		\$11,971	\$0	\$0	\$11,971	\$15,000	\$450,000	25 wells, each 25 feet deep, 4 vents, per WARP
Total Site Improvements								\$535,786	
Pond Sediments and Soils									
Construct Slurry Wall	59926 square feet		\$10.00	\$11.15	\$7.00	\$28.15	\$35.27	\$2,113,721	0216840300
Dewater Pond	12 days		\$0.00	\$69.50	\$20.50	\$90.00	\$112.77	\$1,297	Pumping 8 hours. Attended 2 hrs. per day 021404650
Transport water	8 days		\$475.00	\$0.00	\$344.60	\$819.60	\$1,026.96	\$8,216	Transport water to OU 1 or OU 2 treatment system 0164201840
Excavate Sediments	3590 cubic yards		\$0.00	\$2.15	\$2.15	\$4.30	\$5.39	\$38,685	222422440
Haul and Spread Sediments	11601 cubic yards		\$0.00	\$0.53	\$1.33	\$1.86	\$2.33	\$27,037	12 cubic yards per dump, 1/4 miles, 0222660320
Total Pond Sediments and Soils								\$2,188,956	
Multilayer Cap									
Compact Voids	1 week		\$1,570.00	\$0.00	\$2,330.00	\$3,900.00	\$4,886.70	\$3,860	0164080140
Install Foundation Layer									
Purchase and Haul	5E+05 tons		\$3.50	\$1.01	\$2.78	\$7.29	\$9.13	\$4,273,058	0222120200, Purchase and haul
Placement and Spreading	5E+05 cubic yards		\$0.00	\$0.38	\$1.15	\$1.53	\$1.92	\$896,815	Dozer, no compaction 0222084420
Compaction	5E+05 cubic yards		\$0.00	\$0.21	\$0.43	\$0.64	\$0.80	\$375,138	Sheepsfoot roller, 0222203000 (see below)
Install Gas Vent Layer									
Install Geogrid	1E+05 square yards		\$3.24	\$0.63	\$0.00	\$3.87	\$4.85	\$580,681	
Install Geosynthetic Clay Liner	1E+05 square yards		\$3.69	\$0.90	\$0.00	\$4.59	\$5.75	\$688,715	i.e. 1/4 inch Bentomat
Install Flexible Membrane Liner	1E+05 square yards		\$0.81	\$0.90	\$0.00	\$1.71	\$2.14	\$256,580	30 mil
Install Drainage Layer	57,800 cubic yards		\$9.50	\$1.01	\$2.78	\$13.29	\$16.65	\$962,507	Washed sand, 0222120400
Vegetative Soil Cover									
Purchase and Haul	70,000 cubic yards		\$12.75	\$1.01	\$2.78	\$16.54	\$20.72	\$1,450,723	Topsoil, weed-free, 0222120800
Spreading	70,000 cubic yards		\$0.00	\$0.13	\$0.38	\$0.51	\$0.64	\$44,732	Dozer, no compaction, 0222084020

1 Unit Total with O&P includes overhead and profit

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Material	Unit Costs Labor	Equip	Unit Total	Unit Total with O&P	Total Cost	Notes
Compaction	70,000 cubic yards		\$0.00	\$0.21	\$0.42	\$0.63	\$0.79	\$55,257	Sheepsfoot roller, 0222220300
Revegetation									
Soil Preparation	1E+05 cubic yards		\$0.00	\$3.10	\$1.79	\$4.89	\$6.13	\$760,382	1/2 CY Backhoe, 0292081200
Compaction	1E+05 cubic yards		\$0.00	\$7.55	\$0.00	\$7.55	\$9.46	\$1,174,005	Sheepsfoot roller, 0222040300
Seed	27 acres		\$540.00	\$10.05	\$71.50	\$621.55	\$778.80	\$21,028	Seed, liquid fertilizer, 0293042200
Subtotal Multilayer Cap								\$11,543,481	
Construction Quality Assurance								\$577,174	5 percent of total multilayer cap price
Total Multilayer Cap								\$12,120,655	
Groundwater Collection and Treatment System									
Install French Drains									
Excavate Drainage Trench	9 cubic yards		\$0.00	\$3.96	\$2.28	\$6.24	\$7.82	\$70	2' x 2' x 60', 0214040010
Dewater drainage trench	5 days		\$0.00	\$69.50	\$20.50	\$90.00	\$112.77	\$564	021404650
Transport Water	5 days		\$475.00	\$0.00	\$344.60	\$819.60	\$1,026.96	\$5,135	0164201840
Impermeable membrane	2400 square feet		\$0.19	\$0.62	\$0.00	\$0.81	\$1.01	\$2,436	PVC 20 mil, 0711022500
Gravel layer	480 cubic yards		\$14.75	\$1.01	\$2.78	\$18.54	\$23.23	\$11,151	1/2 inch crushed stone, 0222120340
Backfill and compact	860 cubic yards		\$0.00	\$0.21	\$0.43	\$0.64	\$0.80	\$690	Sheepsfoot roller, 022220300
Install Additional Storage Tank									
Install Utility Bed	1977 cubic yards		\$3.75	\$5.08	\$2.04	\$10.87	\$13.62	\$26,927	260120200
Install Piping	1977 linear foot		\$9.80	\$7.30	\$0.00	\$17.10	\$21.43	\$42,360	1515510240
Install Pad	1 pad		\$9,750	\$1,775	\$0.00	\$11,525.00	\$14,440.83	\$14,441	132151558
Install Tank	1 tank		\$11,100	\$1,775	\$0.00	\$12,875.00	\$16,132.38	\$16,132	1321511120
Install Pump	1 pump		\$221.00	\$47.00	\$0.00	\$268.00	\$335.80	\$336	1524807560
Utilities									
Install Utility Poles	5 poles		\$510.00	\$235.00	\$44.50	\$789.50	\$989.24	\$4,946	1671102800
Install Wiring	40 100 feet		\$7.20	\$20.50	\$0.00	\$27.70	\$34.71	\$1,388	1311650100
Install Panel Board	1 each		\$560.00	\$350.00	\$0.00	\$910.00	\$1,140.23	\$1,140	20 circuits, 1632450700
Install Transformer	1 each		\$735.00	\$380.00	\$0.00	\$1,115.00	\$1,397.10	\$1,397	1641201300
Total Groundwater Collection and Treatment System								\$127,716	
Gas Collection System									
Install Geotextile Filter	2E+05 square yards		\$0.54	\$0.27	\$0.00	\$0.81	\$1.01	\$152,240	
Install Gas Vent Layer	77000 cubic yards		\$9.50	\$1.01	\$2.78	\$13.29	\$16.65	\$1,282,232	Washed sand, 0222120400
Install Pipes	10000 linear feet		\$4.30	\$8.80	\$0.00	\$13.10	\$16.41	\$164,143	4 inch PVC, 1515511940
Install Drain Rock	3000 cubic yards		\$14.75	\$1.01	\$2.78	\$18.54	\$23.23	\$69,692	1/2 inch, 0222120340
Install Vacuum Blowers	6 fans		\$5,525	\$325	\$0.00	\$5,850.00	\$7,330.05	\$43,980	10 horsepower axial fan, 1572900120
Install Header	50 tee		\$60.00	\$71.00	\$0.00	\$131.00	\$164.14	\$8,207	Cleanout Tee, 151150240
Install Flare	1 flare		\$100,000	\$0.00	\$0.00	\$100,000	\$125,300	\$125,300	Flare
Install Geotextile Filter	1E+05 square yards		\$0.54	\$0.27	\$0.00	\$0.81	\$1.01	\$132,601	
Utilities									
Install Utility Poles	14 poles		\$510.00	\$235.00	\$44.50	\$789.50	\$989.24	\$13,849	1671102800
Install Cable	70 100 feet		\$7.20	\$20.50	\$0.00	\$27.70	\$34.71	\$2,430	1311650100
Install Panel Board/Switches	1		\$560.00	\$350.00	\$0.00	\$910.00	\$1,140.23	\$1,140	20 circuits, 163240700
Install Wiring	1		\$735.00	\$380.00	\$0.00	\$1,115.00	\$1,397.10	\$1,397	1641201300

1 Unit Total with O&P includes overhead and profit

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Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Material	Unit Costs Labor	Equip	Unit Total	Unit Total With O&P	Total Cost Notes
Total Gas Collection System								
Institutional Control - Fencing	4920 linear feet		\$5.25	\$2.42	\$0.00	\$7.67	\$9.61	\$1,997,211 \$47,284
Subtotal Construction								
Construction Support								
Health and Safety Supplies	12 months		\$1,000.00	\$0.00	\$0.00	\$1,000.00	\$1,253.00	\$15,036 12 months construction
Training	830 hours		\$50.00	\$0.00	\$0.00	\$50.00	\$62.65	\$52,000 24 hours per person, 35 people
Decontamination								\$1,508,267 9 percent of total construction costs
Miscellaneous Consumables								\$1,508,267 9 percent of total construction costs
Mobilization/Demobilization								\$1,333,457 8 percent of total construction costs
Subtotal Construction Support								
Total Construction								
\$4,417,027								
\$21,306,919								
CLOSURE REPORTING								
CAD/ROD	1		\$50,000	\$6,000	\$0	\$56,000	\$70,168	\$70,168
Closure Certification	1		\$25,000	\$0	\$0	\$25,000	\$31,325	\$31,325
Survey Plat	32 acre		\$44	\$410	\$0	\$454	\$568	\$18,184 133060320
Record of Wastes	1		\$15,000	\$0	\$0	\$15,000	\$18,795	\$18,795
Deed of Notation	1		\$15,000	\$0	\$0	\$15,000	\$18,795	\$18,795
Post-closure Risk Assessment	1		\$287,596	\$0	\$0	\$287,596	\$360,358	\$360,358
Current Contract MTS 353017TB3TRB234-9								

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